SIM2 Multimedia

SIM2 HT3000E.
RS-232C Control Specifications

Rev. 1.0 (4 February 2008)

Contents

Revision History

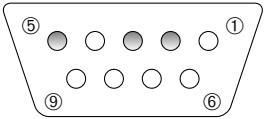| Rev.	Date	Software Version	Description of Change
1.0	4 February 2008	3.12.47 or higher	Initial version.

1 Introduction

This document describes how to interface the SIM2 HT3000E. projector with a Home Theater control system (or a PC) over a direct serial connection.

1.1 Setting up the RS-232C Serial connection

Follow these steps to configure the control system (or the PC) serial port.

- Switch off the control system (or the PC) and the projector.
- Use a standard straight[1] serial cable with 9 pin female to the control system (or the PC) and 9 pin male to the Projector:

RS-232C Control Port

Pin No	Signal	Definition
1	-	Not used
2	TD	Transmit data
3	RD	Receive data
4	-	Not used
5	GND	Ground
6	-	Not used
7	-	Not used
8	-	Not used
9	-	Not used

D-SUB 9-pin (female)

- Make sure the distances between equipment do not exceed the specifications of the interface (15 m or 50 feet).
- Switch on the control system (or the PC) and, after start up, switch on the projector.
- Set the Serial Port Parameters as shown below:

Communication Parameters

Parameter	Value
Transfer Rate	19200 bps
Data Bits	8
Parity Bit	None
Stop Bit	1
Flow Control	None

- Set the the control system (or the PC program) Communication Mode to Binary (or Hex). ASCII mode is not supported.
- Set the the control system interface (or the PC communication program) Display Mode to Hex.

---

[1]A cable that connects identical pin numbers in each connector: pin ② connects to pin ②, pin ③ to pin ③ and pin ⑤ to pin ⑤.

1.2 Execution of the command

Command execution time may vary from 0.1 to 2.0 seconds, depending on the operation that have been requested.

If the projector is busy when a command is sent, the unit may not accept the command. When several commands are to be sent one after the other, sufficient time between them should be allowed.

When the unit is switched on from Standby wait 30 seconds before sending commands or reading messages sent by the projector.

2 Commands

In this section, serial commands (and respective responses) are listed. Commands (and responses) are series of bytes (numbers holding values from 0 to 255).

In the following, bytes are represented by couples of hexadecimal digits, shown in monospace (fixed-width) type (for example: `EF`[1]). Spaces between bytes (for example: `E4 48`) have been inserted just to make the command more readable and are not part of the command itself.

Commands do not require any termination character: do not add <LF>, <CR>, <EOT> or the like at the end of the given series of bytes.

2.1 Remote Control Keys Codes

The following serial commands are meant to emulate button presses on the SIM2 HT3000E. IR Remote Control. Like remote button presses they interact with the OSD of the projector.

Key	Command
Standby	BE EF 02 06 00 51 E4 48 01 00 00 00 00
0/On [1]	BE EF 02 06 00 6B E6 52 01 00 00 00 00
1 [2]	BE EF 02 06 00 80 E5 49 01 00 00 00 00
2 [2]	BE EF 02 06 00 B3 E5 4A 01 00 00 00 00
3 [2]	BE EF 02 06 00 62 E4 4B 01 00 00 00 00
4 [2]	BE EF 02 06 00 D5 E5 4C 01 00 00 00 00
5 [2]	BE EF 02 06 00 04 E4 4D 01 00 00 00 00
6 [2]	BE EF 02 06 00 37 E4 4E 01 00 00 00 00
7 [3]	BE EF 02 06 00 E6 E5 4F 01 00 00 00 00
8 [3]	BE EF 02 06 00 89 E7 50 01 00 00 00 00
9 [3]	BE EF 02 06 00 58 E6 51 01 00 00 00 00
Esc	BE EF 02 06 00 0D E6 54 01 00 00 00 00
Cursor Up	BE EF 02 06 00 DC E7 55 01 00 00 00 00
Cursor Left	BE EF 02 06 00 EF E7 56 01 00 00 00 00
Cursor Right	BE EF 02 06 00 3E E6 57 01 00 00 00 00
Cursor Down	BE EF 02 06 00 C1 E6 58 01 00 00 00 00
Menu Left (−)	BE EF 02 06 00 10 E7 59 01 00 00 00 00
Menu Right (+)	BE EF 02 06 00 23 E7 5A 01 00 00 00 00
Freeze	BE EF 02 06 00 F2 E6 5B 01 00 00 00 00
Memory	BE EF 02 06 00 45 E7 5C 01 00 00 00 00
Memory 1 Recall	BE EF 02 06 00 A8 F2 A1 01 00 00 00 00
Memory 2 Recall	BE EF 02 06 00 9B F2 A2 01 00 00 00 00
Memory 3 Recall	BE EF 02 06 00 4A F3 A3 01 00 00 00 00
Memory 4 Recall	BE EF 02 06 00 FD F2 A4 01 00 00 00 00
Memory 5 Recall	BE EF 02 06 00 2C F3 A5 01 00 00 00 00
Memory 6 Recall	BE EF 02 06 00 1F F3 A6 01 00 00 00 00
F1	BE EF 02 06 00 94 E6 5D 01 00 00 00 00
F2	BE EF 02 06 00 76 E7 5F 01 00 00 00 00
Info	BE EF 02 06 00 A7 E6 5E 01 00 00 00 00
Auto	BE EF 02 06 00 79 E2 60 01 00 00 00 00
Aspect	BE EF 02 06 00 A8 E3 61 01 00 00 00 00

---

[1]A variety of alternative conventions are used for representing hexadecimal digits, the most common being: Hex EF, EF_{16}, EFh, 0xEF.

Aspect Normal	BE EF 02 06 00 2A F4 83 01 00 00 00 00
Aspect Anamorphic	BE EF 02 06 00 9D F5 84 01 00 00 00 00
Aspect Letterbox	BE EF 02 06 00 4C F4 85 01 00 00 00 00
Aspect Panoramic	BE EF 02 06 00 7F F4 86 01 00 00 00 00
Aspect Subtitle	BE EF 02 06 00 62 F5 8B 01 00 00 00 00
Aspect Pixel to Pixel	BE EF 02 06 00 AE F5 87 01 00 00 00 00
Aspect User 1	BE EF 02 06 00 51 F5 88 01 00 00 00 00
Aspect User 2	BE EF 02 06 00 80 F4 89 01 00 00 00 00
Aspect User 3	BE EF 02 06 00 B3 F4 8A 01 00 00 00 00

Notes:

[1] When the unit is in Standby state, this command switches the unit on and the last source memorized prior to switch off is automatically selected.
When the unit is On, this command displays the Source Selection window of the OSD.

[2] When the unit is in Standby state, this command switches the unit on and the corresponding source is selected.
When the unit is On, and OSD is not displayed, this command selects the corresponding source.

[3] When the unit is in Standby state, this command switches the unit on and the last source memorized prior to switch off is automatically selected.

The response of the unit to a correct Remote Control Key Code consists of a single byte:

OK	06
Error	15

2.2 Operation Commands

The following codes provide direct access to SIM2 HT3000E. User Interface operations not accessible via a single Remote Control command. When an Operation Command is sent, OSD does not appear over the picture.
Most of the following commands require a valid signal on the selected input. If the status of the input signal is 'No signal' (see Section 2.3) they won't be executed and an Error code will be sent back by the projector. Only the following two commands are acknowledged and executed in a 'No signal' condition:

- Lamp Power
- Orientation

Brightness

Action	Command	Response
Increment	BE EF 1A 0C 00 5E A3 00 00 02 00 00 00 00 00 00 00 00 00	OK 20 XX 00
Decrement	BE EF 1A 0C 00 9B F2 00 00 03 00 00 00 00 00 00 00 00 00	Error 15
Get	BE EF 1A 0C 00 51 53 00 00 01 00 00 00 00 00 00 00 00 00	

XX is the hex representation of the value of Brightness.
Example: if the returned value is XX = 3C then Brightness value is 60.

Contrast

Action	Command	Response
Increment	BE EF 1A 0C 00 9D 5E 01 00 02 00 00 00 00 00 00 00 00 00	OK 20 XX 00
Decrement	BE EF 1A 0C 00 58 0F 01 00 03 00 00 00 00 00 00 00 00 00	Error 15
Get	BE EF 1A 0C 00 92 AE 01 00 01 00 00 00 00 00 00 00 00 00	

XX is the hex representation of the value of Contrast.
Example: if the returned value is XX = 3C then Contrast value is 60.

Color

Action	Command	Response
Increment	BE EF 1A 0C 00 5A A7 03 00 02 00 00 00 00 00 00 00 00 00	OK 20 XX 00
Decrement	BE EF 1A 0C 00 9F F6 03 00 03 00 00 00 00 00 00 00 00 00	Error 15
Get	BE EF 1A 0C 00 55 57 03 00 01 00 00 00 00 00 00 00 00 00	

XX is the hex representation of the value of Color.
Example: if the returned value is XX = 3C then Color value is 60.

Tint

Action	Command	Response
Increment	BE EF 1A 0C 00 99 5A 02 00 02 00 00 00 00 00 00 00 00 00	OK 20 XX 00
Decrement	BE EF 1A 0C 00 5C 0B 02 00 03 00 00 00 00 00 00 00 00 00	Error 15
Get	BE EF 1A 0C 00 96 AA 02 00 01 00 00 00 00 00 00 00 00 00	

XX is the hex representation of the value of Tint.
Example: if the returned value is XX = 3C then Tint value is 60.

Cinema Mode

Action	Command	Response	
Set Off	BE EF 1A 0C 00 84 12 0C 00 00 00 00 00 00 00 00 00 00 00	OK	20 XX 00
Set Auto	BE EF 1A 0C 00 91 52 0C 00 00 00 03 00 00 00 00 00 00 00		03 Auto
Get	BE EF 1A 0C 00 41 43 0C 00 01 00 00 00 00 00 00 00 00 00		00 Off
		Error	15

XX is the hex representation of the value of Cinema Mode.
Example: if the returned value is XX = 03 then Cinema Mode is set to Auto.

Color Management: Primaries

Action	Command	Response	
Set Native	BE EF 1A 0C 00 68 FE 41 00 00 00 00 00 00 00 00 00 00 00	OK	20 XX 00
Set HDTV	BE EF 1A 0C 00 A4 3F 41 00 00 00 01 00 00 00 00 00 00 00		00 Native
Set EBU	BE EF 1A 0C 00 B1 7F 41 00 00 00 02 00 00 00 00 00 00 00		01 HDTV
Set SMPTE-C	BE EF 1A 0C 00 7D BE 41 00 00 00 03 00 00 00 00 00 00 00		02 EBU
Set Auto	BE EF 1A 0C 00 9B FF 41 00 00 00 04 00 00 00 00 00 00 00		03 SMPTE-C
Set PC	BE EF 1A 0C 00 57 3E 41 00 00 00 05 00 00 00 00 00 00 00		04 Auto
Get	BE EF 1A 0C 00 AD AF 41 00 01 00 00 00 00 00 00 00 00 00		05 PC
		Error	15

XX is the hex representation of the value of the Primaries adjustment.

Note: PC refers to Primaries values that the PC application LiveColorsCalibration downloads into the projector.

Example: if the returned value is XX = 02 then Primaries are set to EBU.

Color Management: White Point

Action	Command	Response	
Set Standard	BE EF 1A 0C 00 B7 DE 39 00 00 00 0A 00 00 00 00 00 00 00	OK	20 XX 00
Set High	BE EF 1A 0C 00 C8 5E 39 00 00 00 00 00 00 00 00 00 00 00		0A Standard
Set Medium	BE EF 1A 0C 00 04 9F 39 00 00 00 01 00 00 00 00 00 00 00		00 High
Set Low	BE EF 1A 0C 00 11 DF 39 00 00 00 02 00 00 00 00 00 00 00		01 Medium
Set Native	BE EF 1A 0C 00 DD 1E 39 00 00 00 03 00 00 00 00 00 00 00		02 Low
Set D75	BE EF 1A 0C 00 44 DF 39 00 00 00 0E 00 00 00 00 00 00 00		03 Native
Set D65	BE EF 1A 0C 00 7B 1F 39 00 00 00 0B 00 00 00 00 00 00 00		0E D75
Set D50	BE EF 1A 0C 00 9D 5E 39 00 00 00 0C 00 00 00 00 00 00 00		0B D65
Set C	BE EF 1A 0C 00 51 9F 39 00 00 00 0D 00 00 00 00 00 00 00		0C D50
Set User	BE EF 1A 0C 00 3B 5F 39 00 00 00 04 00 00 00 00 00 00 00		0D C
Get	BE EF 1A 0C 00 0D 0F 39 00 01 00 00 00 00 00 00 00 00 00		04 User
		Error	15

XX is the hex representation of the value of the White Point.

Example: if the returned value is XX = 0B then the White Point is set to D65.

Best Color

Action	Command	Response	
Set Off	BE EF 1A 0C 00 07 AF 3D 00 00 00 00 00 00 00 00 00 00 00	OK	20 XX 00
Set On	BE EF 1A 0C 00 CB 6E 3D 00 00 00 01 00 00 00 00 00 00 00		00 Off
Get	BE EF 1A 0C 00 C2 FE 3D 00 01 00 00 00 00 00 00 00 00 00		01 On
		Error	15

XX is the hex representation of the value of Best Color.

Example: if the returned value is XX = 01 then Best Color is On.

Gamma

Action	Command		Response	
Set ST1	BE EF 1A 0C 00 05 CB 36 00 00 00 02 00 00 00 00 00 00 00 00	OK	20 XX 00	
Set ST2	BE EF 1A 0C 00 F6 CA 36 00 00 00 06 00 00 00 00 00 00 00 00		02 ST1	
Set ST3	BE EF 1A 0C 00 7A 4B 36 00 00 00 08 00 00 00 00 00 00 00 00		06 ST2	
Set ST4	BE EF 1A 0C 00 B6 8A 36 00 00 00 09 00 00 00 00 00 00 00 00		08 ST3	
Set ST5	BE EF 1A 0C 00 A3 CA 36 00 00 00 0A 00 00 00 00 00 00 00 00		09 ST4	
Set EN1	BE EF 1A 0C 00 DC 4A 36 00 00 00 00 00 00 00 00 00 00 00 00		0A ST5	
Set EN2	BE EF 1A 0C 00 10 8B 36 00 00 00 01 00 00 00 00 00 00 00 00		00 EN1	
Set EN3	BE EF 1A 0C 00 2F 4B 36 00 00 00 04 00 00 00 00 00 00 00 00		01 EN2	
Set EN4	BE EF 1A 0C 00 6F 0B 36 00 00 00 0B 00 00 00 00 00 00 00 00		04 EN3	
Set EN5	BE EF 1A 0C 00 89 4A 36 00 00 00 0C 00 00 00 00 00 00 00 00		0B EN4	
Set GR1	BE EF 1A 0C 00 E3 8A 36 00 00 00 05 00 00 00 00 00 00 00 00		0C EN5	
Set GR2	BE EF 1A 0C 00 3A 0B 36 00 00 00 07 00 00 00 00 00 00 00 00		05 GR1	
Get	BE EF 1A 0C 00 19 1B 36 00 01 00 00 00 00 00 00 00 00 00 00		07 GR2	
		Error	15	

XX is the hex representation of the value of Gamma.
Example: if the returned value is XX = 04 then Gamma is set to EN3.

Overscan

Action	Command		Response	
Increment	BE EF 1A 0C 00 91 52 04 00 02 00 00 00 00 00 00 00 00 00 00	OK	20 XX 00	
Decrement	BE EF 1A 0C 00 54 03 04 00 03 00 00 00 00 00 00 00 00 00 00	Error	15	
Get	BE EF 1A 0C 00 9E A2 04 00 01 00 00 00 00 00 00 00 00 00 00			

XX is the hex representation of the value of Overscan.
Example: if the returned value is XX = 0A then Overscan value is 10.

Lamp Power

Action	Command		Response	
Set 160	BE EF 1A 0C 00 5F 85 25 00 00 00 A0 00 00 00 00 00 00 00 00	OK	20 XX 00	
Set 170	BE EF 1A 0C 00 20 05 25 00 00 00 AA 00 00 00 00 00 00 00 00		A0 160	
Set 180	BE EF 1A 0C 00 A0 85 25 00 00 00 B4 00 00 00 00 00 00 00 00		AA 170	
Set 190	BE EF 1A 0C 00 DF 05 25 00 00 00 BE 00 00 00 00 00 00 00 00		B4 180	
Set 200	BE EF 1A 0C 00 D1 82 25 00 00 00 C8 00 00 00 00 00 00 00 00		BE 190	
Get	BE EF 1A 0C 00 E2 DE 25 00 01 00 00 00 00 00 00 00 00 00 00		C8 200	
		Error	15	

XX is the hex representation of the value of Lamp Power.
Example: if the returned value is XX = B4 then Lamp Power value is 180W.

Orientation

Action	Command		Response
Set Floor-Rear	BE EF 1A 0C 00 D8 4E 35 00 00 00 00 00 00 00 00 00 00 00	OK	20 XX 00
Set Ceiling	BE EF 1A 0C 00 14 8F 35 00 00 00 01 00 00 00 00 00 00 00		00 Floor-Rear
Set Floor	BE EF 1A 0C 00 01 CF 35 00 00 00 02 00 00 00 00 00 00 00		01 Ceiling
Set Ceil-Rear	BE EF 1A 0C 00 CD 0E 35 00 00 00 03 00 00 00 00 00 00 00		02 Floor
Get	BE EF 1A 0C 00 1D 1F 35 00 01 00 00 00 00 00 00 00 00 00		03 Ceil-Rear
		Error	15

XX is the hex representation of the value of Orientation.
Example: if the returned value is XX = 01, then Orientation is set to Ceiling.

2.3 Status Commands

Status Commands may be used to get the current value of the main projector parameters.

<div align="center">Status Commands</div>

Parameter	Command
Projector Status	BE EF 10 0A 00 34 B7 01 01 00 01 01 15 01 00 00 02
Signal Status	BE EF 10 0A 00 33 37 01 01 00 01 01 15 01 00 00 08
Lamp Status	BE EF 10 0A 00 A9 36 01 01 00 01 01 15 01 00 01 10

Projector Status

If the unit is On, the returned packet (27 byte long) is described in the following table:

1E BE EF 10 13 00 .. .. 01 01 00 01 01 15 01 00 00 02 00 00 00 SS .. FF FF .. ..
0 1   17 18   20 21   23 24

where bytes marked with .. are not relevant.

The response may be separated into 4 parts:

- 1 bytes (byte 0) that initiates the packet (1E)

- 17 bytes (bytes 1-17) that duplicate the sent command (apart from 2 of them — the CRC)

- 3 Error bytes (bytes 18-20) that signal errors in the processing of the command

- 4 Data bytes (bytes 21-24) that contain the requested data

If the 3 Error bytes (bytes 18-20) are 00 00 00 then requested data are valid.

The tables below explain the meaning of returned data.

- Byte 21 (labeled **SS** in the table above) contains **Projector Status**:

On	01
Lamp Ignition	02
Lamp Restrike	03
Lamp Cooling	04

- Bytes 23 and 24 (labeled **FF FF** in the table above) contain the **Failure Condition** (if any):

OK (No failure)	00 00
Lamp Failure	00 01
Fan Failure (Lamp Cooling)	00 02
Overtemperature (Lamp Cooling)	00 08

If the unit is in Standby State this command is not recognized as a valid one, therefore the response is 15.

Signal Status

When then unit is On, the returned packet (25 byte long) is described in the following table:

1E	BE	EF	10	11	00	..	..	01	01	00	01	01	15	01	00	00	08	00	00	00	SS	..	..	II
0	1																17	18		20	21			24

where bytes marked with .. are not relevant.

The response may be separated into 4 parts:

- 1 bytes (byte 0) that initiates the packet (1E)

- 17 bytes (bytes 1-17) that duplicate the sent command (apart from 2 of them — the CRC)

- 3 Error bytes (bytes 18-20) that signal errors in the processing of the command

- 4 Data bytes (bytes 21-24) that contain the requested data

If the 3 Error bytes (bytes 18-20) are 00 00 00 then requested data are valid.

The tables below explain the meaning of returned data.

- Byte 21 (labeled **SS** in the table above) contains current **Input Status**:

OK	00
No Signal	01
Signal Out of Range	02

- Byte 24 (labeled **II** in the table above) contains **Current Input**:

1	Video	00
2	S-Video	02
3	YPrPb	04
	RGB	05
4	Graphics RGB	0C
	Graphics YPrPb	0D
5	HDMI 1	12
6	HDMI 2	13

If the unit is in Standby State the unit does not respond to this command.

Lamp Status

When then unit is On, the returned packet (27 byte long) is described in the following table:

1E	BE	EF	10	13	00	..	..	01	01	00	01	01	15	01	00	01	10	00	00	00	UU	UU	..	SS	LL	LL
0	1																17	18		20	21	22		24	25	26

where bytes marked with .. are not relevant.

The response may be separated into 4 parts:

- 1 bytes (byte 0) that initiates the packet (1E)

- 17 bytes (bytes 1-17) that duplicate the sent command (apart from 2 of them — the CRC)

- 3 Error bytes (bytes 18-20) that signal errors in the processing of the command

- 6 Data bytes (bytes 21-26) that contain the requested data

If the 3 Error Bytes (bytes 18-20) are 00 00 00 then requested data are valid.

The tables below explain the meaning of returned data.

- Bytes 21 and 22 (labeled **UU UU** in the table above) contain **Unit Working Hours**.
  UU UU is the hex representation of the number of working hours.
  Therefore, if, for instance, UU UU = 09 D8 then Unit Working Hours is 2520.

- Byte 24 (labeled **SS** in the table above) contains the **Lamp Status**:

Off	00
Ignition	01
On	02

- Bytes 25 and 26 (labeled **LL LL** in the table above) contain **Lamp Working Hours**.
  LL LL is the hex representation of the number of working hours.
  Therefore, if, for instance, LL LL = 01 B6 then Unit Working Hours is 438.

If the unit is in Standby State the unit does not respond to this command.

3 Examples

Send the simulated 'SWITCH ON FROM STANDBY' Remote Control keycode

Remote Control allows Switching on from Standby via the key '0'.
Send the code relative to key '0':

    BE EF 02 06 00 6B E6 52 01 00 00 00 00

The projector switches on and the last source memorized prior to switch off is automatically selected.

Send the simulated 'MENU RIGHT' Remote Control keycode

Send the command:

    BE EF 02 06 00 23 E7 5A 01 00 00 00 00

The On Screen Display appears on the screen.
The projector returns the response code:

    06

which means that the command has been acknowledged with no error.

Send the 'CONTRAST DECREMENT' Operation Command

Contrast value is 60.
Send the command:

    BE EF 1A 0C 00 58 0F 01 00 03 00 00 00 00 00 00 00 00 00

The projector returns the response code:

    20 3B 00

which means:

- acknowledged with no error
- new Contrast value is now 3B = 59.

Send 'PROJECTOR STATUS' Status Command

Send the command:

    BE EF 10 0A 00 34 B7 01 01 00 01 01 15 01 00 00 02

The projector returns the response code:

    BE EF 10 13 00 .. .. 01 01 00 01 01 15 01 00 00 02 00 00 00 01 .. 00 00 .. ..

which means:

- Command has been executed with success (Error bytes, 18-20, are 00 00 00)
- Projector is On (Projector Status, byte 21, is 01)
- There is no Failure (Failure Conditions bytes, 23-24, are 00 00).

Please note that bytes marked with .. are not relevant.